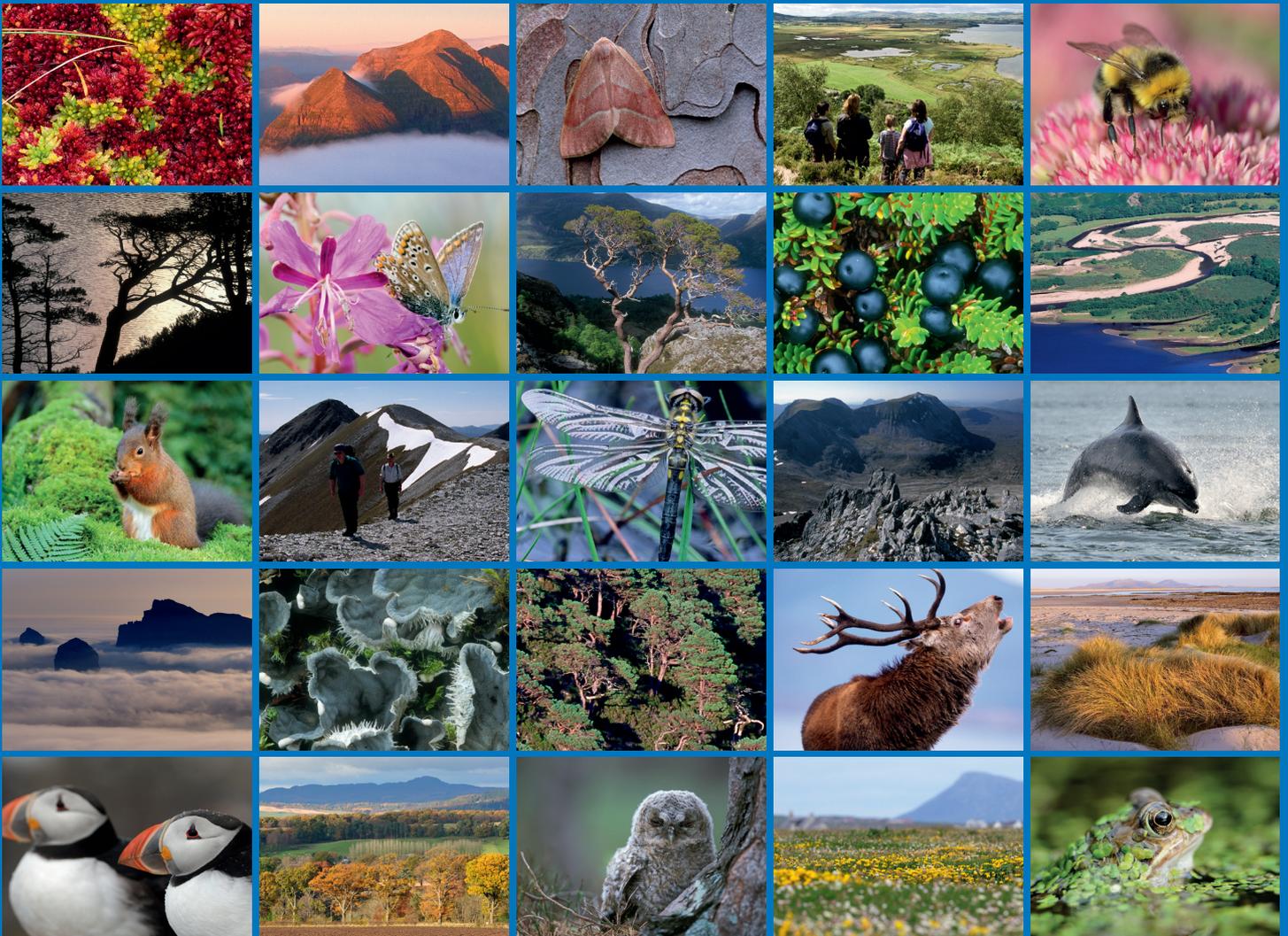


Seabird counts at North Caithness Cliffs SPA in 2015 and 2016 for Marine Renewables Casework





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RESEARCH REPORT

Research Report No. 965

**Seabird counts at North Caithness Cliffs
SPA in 2015 and 2016 for Marine
Renewables Casework**

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RESEARCH REPORT

Summary

Seabird counts at North Caithness Cliffs SPA in 2015 and 2016 for Marine Renewables Casework

Research Report No. 965

Project No: 016004

Contractor: Bob Swann, North of Scotland Ornithological Services

Year of publication: 2018

Background

The North Caithness Cliffs SPA underwent a seabird census in 1986 and was last fully counted in 1999 and 2000. Since then there have been major changes in many seabird populations throughout Scotland (Foster & Marrs 2012). A number of development locations have been identified for the generation of renewable energy from offshore wind, tidal and wave energy at sites along the east coast of Scotland and across the Pentland Firth and Orkney Waters. It is important to have up to date information on the current status of the north Caithness seabird populations.

Main findings

Seabird counts undertaken in 2015 and 2016 within the SPA revealed:

- Northern fulmar – 13,405 AOS in 2015/16, 7% lower than 1999 and part of a slow decline since 1986.
- European shag – 170 AON, 66% higher than 1999.
- Black-legged kittiwake – 5,568 AON, a decline of 55% since 1999 and 64% since 1986.
- Herring gull – 232 AOT, 33% higher than in 1999.
- Great black-backed gull – 68 AOT, an increase of 81% since 1999.
- Common guillemot – 38,863 birds, a decline of 53% since 1999, but still 93% higher than the numbers present in 1986.
- Razorbill – 3,503 birds, an increase of 39% since 1999 and a continuation of a long term 112% increase since 1986.
- Atlantic puffin – 3,053 birds counted, 55% lower than the 1999 count, but just 13% lower than the numbers present in 1986.
- The long-term trend for the four key SPA species shows that generally they have fared better at the North Caithness Cliffs SPA when compared with the overall Scottish trend. Although the long-term decline in black-legged kittiwake is similar to the Scottish trend, the decline in northern fulmar is far less and for common guillemot and razorbill the overall increase is greater.
- Changes in methodology between the 1999/2000 and 2015/2016 surveys may have had some effects on these results, but these were thought to be minor.

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Table of Contents	Page
1. INTRODUCTION	1
2. METHODS	3
2.1 Timing and organisation of visits	3
2.2 Species methodology - counts	3
3. RESULTS	5
3.1 Counts according to individual sections	5
3.2 Counts according to designated areas	6
4. COMPARISON WITH PREVIOUS COUNTS	7
4.1 Counts according to designated areas	7
4.2 North Caithness Cliffs SPA – long term trends	8
4.3 North Caithness Cliffs SPA counts v national counts	9
5. DISCUSSION	10
5.1 Changes in methodology	10
5.1.1 Land v sea counts	10
5.1.2 Gulls and Atlantic puffins	10
5.2 North Caithness Cliffs SPA trends v national trends	11
5.2.1 Short-term trends since 1999	11
5.2.2 Long-term trends since 1986	11
6. CONCLUSIONS AND RECOMMENDATIONS	12
7. REFERENCES	13
ANNEX 1: COUNT SECTIONS	14
ANNEX 2: COUNT SECTION VISIT DETAILS	15

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The counts themselves were undertaken by Tracey Begg (TB), Chris Eastham (CE), Mareike Moeller-Holtkamp (MMH), Erica Knott (EK), Chris Leakey (CL), Fiona Manson (FM), Alex Robbins (AR), Natalie Sinclair (NS), Glen Tyler (GT) and Karen Taylor (KT) of the Coastal and Marine Ecosystems and Use unit (CMEU) in SNH, plus Sally Ward (SW) from Northern Isles and North Highland Area SNH office and Andy Douse (AD) from the Ecosystems and Biodiversity Unit. Seven of the twelve were experienced seabird counters, the remaining five were field ecologists with more experience of other taxa. Sub-teams undertaking counts always included at least one experienced seabird counter. Boat counts were undertaken by fully experienced surveyors.

Glen Tyler (SNH Lerwick) provided full details of all counts and promptly responded to all communications regarding the collection of these data. Alex Robbins managed the project, co-ordinated the fieldwork and undertook initial compilation of the data.

1. INTRODUCTION

Scottish Natural Heritage (SNH) commissioned this survey to provide up-to-date population estimates for complete colony counts at North Caithness Cliffs Special Protection Area (SPA). Several sites identified for renewable energy generation from offshore wind, tidal and wave energy are located along the east coast of Scotland or within the Pentland Firth and Orkney Waters. As part of the application process Environmental Impact Assessment (EIA) and Habitats Regulations Appraisal (HRA), including appropriate assessment (AA), are required. The HRA and EIA processes require up-to-date population estimates to permit accurate assessment of the impacts of any development on the SPA qualifying features and other sensitive species. However, the lack of recent counts, particularly for colonies such as North Caithness Cliffs SPA, has increased uncertainty within these assessments. The foraging ranges of seabird qualifying features of the SPA overlap with several wave and tidal lease areas in the Pentland Firth and Orkney Waters.

Complete colony counts were undertaken in 2013 for the North Caithness Cliffs SPA, however, due to methodological issues, the results were considered unreliable. The most recent reliable counts for the SPA were undertaken in 1999 and 2000 ('Seabird 2000'). Previously, a full census for these sites was completed in 1986 (The 'Seabird Colonies Register'). SNH's recently published trend note (<http://www.snh.gov.uk/docs/B1163280.pdf>) has highlighted the declines of many seabird species in Scotland, therefore there is an urgency to establish current population estimates and condition status for the SPA. Without up-to-date estimates of population size the risk of inaccurate future impact modelling undertaken as part of the application process is increased.

Up-to-date counts will therefore enable SNH to provide better advice on marine and terrestrial developments to both regulators, such as Marine Scotland, and to individual project developers. The results of the counts will be included within the fourth national seabird census ('Seabirds Count'). They will also contribute towards SNH's Site Condition Monitoring (SCM) which is undertaken on a six yearly cycle. The third cycle commenced in 2014.



Figure 1. North Caithness Cliffs SPA location. © Crown copyright [and database rights] 2017 OS 100017908

2. METHODS

2.1 Timing and organisation of visits

Counts of the entire north Caithness coast were undertaken in 2015 and 2016 by members of SNH's 'Coastal and Marine Ecosystems and Use' Unit (CMEU), using a mix of land based and boat based counts. In 2015 land based counts were undertaken on 2nd June covering sections around Duncansby Head, Holborn Head and Sandside Head. In addition on 4th June a boat based survey using the 'ERI Aurora', a 6.9m GRP Catamaran supplied by the Environmental Research Institute of North Highland College, University of Highlands and Islands based in Thurso, was undertaken to survey six sections between Skirza Head and St. John's Point.

In 2016 sixteen sections between Skarfskerry and Strathy1 along with the island of Stroma were counted between 11th and 13th June. These counts were undertaken from the sea using the 'Natural Explorer', a 9m Ribcraft commercial rigid inflatable boat hired from Ness Ribs, Inverness. In addition a section of Holborn Head 2 – Clett Stack, not covered in 2015, was also counted.

All visits were made between 0700 and 1700 hours. In order to allow comparisons with the previous survey each section was counted using the same boundaries. Some sections were counted from both land and sea. In these instances the land counts were conducted first and the sub-sections photographed so that uncounted sections could then be recognised and counted from the sea.

The counts were undertaken in suitable weather and sea conditions as per the Seabird Monitoring Handbook (Walsh *et al.*, 1995). Details of the count sections, the count type, weather and sea conditions are given in Annex 1 and 2.

In 2015 and 2016 boat based counts were undertaken by a small group of experienced seabird counters, but land counts undertaken in 2015 involved a mix of experienced and less experienced counters. In order to avoid the known issue of inexperienced counters underestimating seabird numbers, each sub-team included at least one experienced counter and duplicate counts were made of sections where densest aggregations of seabirds were located.

2.2 Species methodology - counts

Northern fulmar. An apparently occupied site (AOS) was counted only when a bird was sitting tightly on a reasonably horizontal area large enough to hold an egg. Two birds on such a site, apparently paired, count as one AOS.

European shag. Apparently occupied nests (AON) were counted. This was straightforward on cliff sections, but not so in boulder areas. Here the number of adults present was used to estimate the number of nests.

Black-legged kittiwake. All apparently occupied nests (AON) were counted. These were substantial or well-constructed nests capable of holding eggs, occupied by at least one bird standing on or within touching distance of the nest. Trace nests – those with minimal amounts of nest material, not capable of housing eggs or young were not counted.

Herring gull, lesser back-backed gull and great black-backed gull. In small colonies on or below cliffs all apparently occupied nests were counted. Where actual nests were likely to be obscured by vegetation, but sitting/standing birds were visible the count was of apparently occupied territories (AOT). In one section the count returned was of individuals (IND). For ease of computation and to enable figures for the whole SPA to be produced the

count of IND was converted to AOT following the method applicable for Terns (Walsh *et al.*, 1995). This is not an accepted method for gulls and the AOT value for the section in question should be treated with due caution, and considered to be an estimate.

Arctic Tern. Flushed adults counted.

Common Guillemot, Razorbill.. All individual birds on land above the spring high water mark were counted.

Atlantic Puffin. All individual birds visible on land above the spring high water mark were counted. This is method 3 from the Seabird monitoring handbook for Britain and Ireland (Walsh *et al* 1995).

Note that in all instances only a single count was recorded per section. If counters were confident that an accurate count had been taken (usually when densities of birds were low) then only a single sweep was conducted. In areas of higher density repeat counts in the same section were undertaken, either by the same observer immediately following a first count, or by two (or more) observers counting simultaneously. Where the numbers recorded were within 10% the mean of two counts or median of three was used as the registered count. Where values differed by more than 10% a repeat count was conducted to improve the estimate. Once the difference between two simultaneous counts or two consecutive counts was 10% or less the figure was recorded as before.

3. RESULTS

3.1 Counts according to individual sections

All sections of the north Caithness coast, holding seabird colonies, were counted from Skirza Head to Strathy Bay. Within this are the sections that make up the North Caithness Cliffs SPA. The results from all visits to each counted section are given in Table 1.

Table 1. Summary of data collected from individual count sections

Site Code	FU	SA	GB	HG	LB	KI	GU	RA	PU	AE
SK11a	688	11		2		240	5282	392		
SK11b	6					87	886	23		
DNH1a	3106	3	1	18			1376	435	14	
DNH1b	76						84	21	2	
DNH2a	801	21	1	11		118	6495	647	2	
DNH2b	211					139	5054	195		
GIL1	62									
SJP1	494		1	13				22	5	
MEY1	35									
OMA1	1665	42	38	35	2	137	7008	549	17	
SCA1				2						
SCA2	120		1	8						4
CLE1	1069		1	39		5		4		
DUN1	394			2			2577	72	33	
DUN2	459		2	1		343	932	51		
DUN3	453	3	1	1		1672	5980	375	1223	
DUN4	1006	5	1				180	39	222	
DUN5	1691	12	4	1				24	126	
CLA1	29		1							
HOL1	89	7	1*	1*						
HOL2a	382	3	9*	113*		2		30	42	
HOL2b	36	1				43	442	21		
HOL3	203			2*		10	57	17	11	
NES1	120	7	3*	43*					7	
USH1	66								4	
USH2										
SAN1	263	9	0	0		195	0	58	3	
SAN2	145	0	3	0		812	745	32	6	
MEL1	361	32	3	0		192	776	175	48	
MEL2	139	9		1		164	343	170	1112	
MEL3	744	5	1	1		1414	646	177	62	
VIC1	367								123	3
VIC2	294	46	3	37				5	6	
STR1	384	9						24	15	

Notes:

Site codes: These are detailed in annex 1 and 2. For sections where counts were done from both land and sea a = land count and b = sea count. Sites in red are out-with the SPA.

Species codes: FU northern fulmar, SA European shag, HG herring gull, LB lesser black-backed gull, GB great black-backed gull, KI black-legged kittiwake, GU common guillemot, RA razorbill, PU Atlantic puffin, AE Arctic Tern

Counts. For units see methods section.

* The counts for GB and HU at Holborn Head (HOL – NES) were recorded as number of individuals and have been converted using the rule 1.5 ind = 1 AOT to retain compatibility with the rest of counts which were recorded as AOT. This is not a recommended method and should be regarded as an estimated count. The original IND count has been reported for this site on the JNCC SMP database.

3.2 Counts according to designated areas

Parts of the north Caithness coast have been given designations under various Acts. As well as the North Caithness Cliffs SPA there are three Sites of Scientific Interest (SSSI) notified in part for their important seabird populations. These are the Duncansby Head SSSI (sections SKI11-DUN2) Stroma SSSI (section OMA1) and Dunnet Head SSSI (DUN1–DUN5). The total number of seabirds counted in these designated areas is given in Table 2.

Table 2. Summary of data collected from designated sites.

	FU*	SA**	GB**	HG**	LB**	KI**	GU***	RA***	PU***	AE**
North Caithness Cliffs SPA	13405	170	68 ⁺	232 ⁺	2	5568	38863	3503	3053	3
Duncansby Head SSSI	4888	35	2	31	0	584	19177	1713	18	0
Stroma SSSI	1665	42	38	35	2	137	7008	549	17	0
Dunnet Head SSSI	4003	20	8	5	0	2015	9669	561	1604	0

⁺ includes count of individuals at Holborn head converted to an AOT equivalent by IND/1.5 = AOT

* Units are Apparently Occupied Sites (AOS)

** Units are Apparently Occupied Nests (AON)

*** Units are adult individuals ashore (Ind)

4. COMPARISON WITH PREVIOUS COUNTS

4.1 Counts according to designated areas

The north Caithness coast was last counted in 1999 and 2000 as part of the Seabird 2000 survey. Table 3 gives details of the total numbers counted in both 1999/2000 and 2015/2016 and the percentage changes.

Table 3. Summary of data collected from all count sections north Caithness coast.

Year	FU	SA**	GB	HG	LB	KI	GU	RA	PU
1999/2000	18060	111	60	210	2	10147	72725	2603	5614
2015/2016	15958	183	75*	331*	2	5573	38863	3558	3083
% change	-12%	65%	25%	58%	0	-45%	-47%	37%	-45%

* includes count of individuals at Holborn head converted to an AOT equivalent by IND/1.5 = AOT

** Shags were not counted on Stroma in 1999. The figures shown, exclude Stroma

Since 1999 European shag (+65%), herring gull (+58%), great black-backed gull (+25%) and razorbill (+37%) have shown substantial increases in numbers along the entire north Caithness coast. Northern fulmar (-12%), has shown a small decline, whilst black-legged kittiwake (-45%), common guillemot (-47%) and Atlantic puffin (-45%) have shown major declines. In addition 7 arctic terns were counted in 2015/16 but no common terns, whereas 63 common terns were counted in 1999/2000 but no Arctic terns.

Table 4 examines the changes within the North Caithness Cliffs SPA. This shows that the trends shown along the entire coast are generally mirrored within the SPA.

Table 4. Summary of data collected from all count sections North Caithness Cliffs SPA.

Year	FU	SA**	GB	HG	LB	KI	GU	RA	PU
1999/2000	14462	75	38	175	2	10147	72725	2526	5605
2015/2016	13405	124	68*	232*	2	5568	38863	3503	3053
% change	-7%	66%	81%	33%	0	-55%	-53%	39%	-55%

* includes count of individuals at Holborn head converted to an AOT equivalent by IND/1.5 = AOT

** Shags were not counted on Stroma in 1999. The figures shown exclude Stroma

Compared to the whole north Caithness coast, the increase for great black-backed gull (+81%) is much larger within the SPA, whereas for northern fulmar the decline is less marked within the SPA. For the key cliff nesting species – auks and black-legged kittiwake, the changes in the SPA are very similar to the entire coastline, mainly due to the fact that most of the colonies for these species are found within the SPA.

The increase in Shag population within the SPA (66%) was very similar to that measured along the whole coast (65%).

The changes in seabird numbers at the Duncansby Head SSSI (Table 5) were similar to those recorded at the North Caithness Cliffs SPA, though the declines in black-legged kittiwakes (-81%) and Atlantic Puffins (-92%) were much greater.

Table 5. Summary of data collected from all count sections Duncansby Head SSSI

Year	FU	SA	GB	HG	LB	KI	GU	RA	PU
1999/2000	4631	15	1	18	0	3140	36109	1226	221
2015/2016	4888	35	2	31	0	584	19177	1713	18
% change	6%	133%	(100%)	72%		-81%	-47%	40%	-92%

The Stroma SSSI showed some very different trends to that recorded in the North Caithness Cliffs SPA as a whole (Table 6).

Table 6. Summary of data collected from Stroma SSSI

Year	FU	SA	GB	HG	LB	KI	GU	RA	PU
1999/2000	600	nc	18	90	2	821	14760	280	26
2015/2016	1665	42	38	35	2	137	7008	549	17
% change	178%	-	111%	-60%	0%	-83%	-53%	96%	-30%

Northern Fulmar (+178%), great black-backed gull (+111%) and razorbill (+96%) showed substantial increases. Herring gulls showed a decline (-60%) and for black-legged kittiwake (-87%) the decline was more severe than that recorded in the SPA. There was no count entered of Shag on Stroma for seabird 2000. The next nearest counts (in 1993 and 1990) suggest that the Stroma population in 2016 has not changed significantly.

The Dunnet Head SSSI also showed some very different trends to that recorded in the North Caithness Cliffs SPA as a whole (Table 7).

Table 7. Summary of data collected from Dunnet Head SSSI

Year	FU	SA	GB	HG	LB	KI	GU	RA	PU
1999/2000	5465	8	0	0	0	2530	8993	433	625
2015/2016	4003	20	8	5	0	2015	9669	561	1604
% change	-27%	150%	-	-	-	-20%	8%	30%	157%

Northern fulmar (-27%) showed a larger decline, whilst black-legged kittiwake (-20%) showed a much lower decline. Common guillemots showed a small increase (+8%), compared to the large declines seen elsewhere, whilst Atlantic puffins (+157%) showed a large increase. Both great black-backed gull and herring gull were absent in 1999/2000 but recorded in small numbers in 2015/16.

4.2 North Caithness Cliffs SPA – long term trends

The North Caithness Cliffs SPA was also counted in 1986 (JNCC 2017) and it was these figures that were used in the classification of the SPA. Note that the figures quoted in the SPA citation are converted counts. Common guillemot and razorbill raw figures were converted using a 'k value' of x1.34 to account for non-attendance during the survey period, giving totals of 26,994 and 2,212 breeding adults respectively. For Atlantic puffin the number quoted in the citation was halved to give 1750 pairs. Table 8 uses the raw, unconverted figures and back-calculated figures for 1986 to compare changes in populations since 1986 for the protected species.

Table 8. Changes in numbers of protected species at the North Caithness Cliffs SPA since 1986.

	FU	KI	GU	RA	PU
1986	16310	15650	20145	1651	3500
1999/2000	14462	10147	72725	2526	5605
2015/2016	13405	5568	38863	3503	3053
% change 1986-2000	-11%	-35%	261%	53%	60%
% change 1986-2016	-17%	-64%	93%	112%	-13%

Razorbill numbers have continued to increase since classification of the site. Although common guillemot numbers have undergone a large decline since 1999, numbers at the SPA are still higher than when the site was first designated. This is due to the very large

increase (+261%) that took place between the 1986 count and the Seabird 2000 count. Atlantic puffin also showed a large increase between the 1986 and Seabird 2000 count, but a 55% decline since then means that numbers are now 13% lower than in 1986. Northern fulmar and black-legged kittiwake have both shown a continual decline since 1986, those of the latter species being quite severe.

For other species, from the data obtained, it was difficult to determine which sections were counted in 1986 and therefore it was not possible to make comparisons with more recent counts. For Arctic Tern, however, it was seen that 699 AOTs were counted, mostly on Stroma, indicating that a major decline has occurred with just 7 individuals being counted in 2015/16.

4.3 North Caithness Cliffs SPA counts v national counts

National seabird population trends are available from JNCC's Seabird Monitoring Programme. The UK trends are presented in an annual report (JNCC 2016), whilst the Scottish trends can be established using data which is available on request from JNCC.

Changes in numbers at the North Caithness Cliffs SPA over the period 1999/2000 to 2015/16 show different trends to changes at a UK and Scottish level over the same period for those species where national data is available (Table 9).

Table 9. Changes in numbers at North Caithness Cliffs SPA 1999/2000 to 2015/16 compared to Scottish and UK trends.

	FU	SA	GB	HG	KI	GU	RA
North Caithness Cliffs SPA	-27%	66%	81%	33%	-55%	-53%	39%
Scotland	-43%	-35%	-50%	-55%	-58%	-24%	-6%
UK	-31%	-34%	-11%	n/a	-44%	5%	32%

European shags, great-black-backed gulls and herring gulls have all shown substantial increases in the North Caithness Cliffs SPA, whilst nationally at both a Scottish and UK level they have shown declines. These three species are, however, only present in small numbers within the SPA. Although razorbills have shown a small decline in the Scottish population, they have shown an increase at the UK level and an even larger increase at North Caithness Cliffs SPA. The decline in black-legged kittiwake is similar to that recorded at a Scottish and UK level. The only monitored species to be doing worse at the North Caithness Cliffs SPA is common guillemot where the decline since 1999 is far greater than Scotland as a whole or compared to the small increase recorded at a UK level.

Over the longer term period between 1986 and 2015 the protected species at the North Caithness Cliffs SPA generally appear to be faring better when compared with the national trends (Table 10).

Table 10. Changes in numbers at North Caithness Cliffs SPA 1986 to 2015 compared to Scottish and UK trends.

	FU	KI	GU	RA
North Caithness Cliffs SPA	-17%	-64%	93%	112%
Scotland	-37%	-68%	-10%	39%
UK	-37%	-60%	37%	87%

Only black-legged kittiwake shows a long-term decline similar to that shown at both a Scottish and UK level. The decline in northern fulmar is less than that shown nationally in Scotland and UK. For both common guillemot and razorbill the long-term increase is greater than that recorded at both the Scottish and UK level.

5. DISCUSSION

5.1 Changes in methodology

The changes shown in this report between the 1999 survey and the present survey may be real, due to methodological changes or may be a combination of both these factors.

To a large extent the 2015/16 count followed the methodology used by the 1999 count. There was, however one major exception. In 1999/2000 all of the counts were done from the sea, whilst in 2015 a number of sections were counted from the land.

5.1.1 Land v sea counts

In 2015 the sections around Duncansby Head, Holborn Head and Sandside Head were counted from the land with follow up boat counts later undertaken to cover some sections not visible from the land at Duncansby Head and Holborn Head. This allowed actual counts to be entered for all sections rather than using a combination of full counts, partial counts and estimates (for unseen areas) as in previous censuses.

The main impact that this may have had is that the inner parts of geos and upper parts of the cliff tend to be easier to count from the land than the sea. This may possibly explain the large increase in gull numbers at Holborn Head. Conversely it is possible that some areas of cliff are hidden from land, which can result in lower auk and kittiwake numbers. The follow up boat counts should have rectified this, although in some instances it can be difficult to work out from a boat perspective what can and cannot be seen from the cliff top. This error was minimised in 2015/16 by recording GPS locations of sections that could and could not be viewed from land.

5.1.2 Gulls and Atlantic puffins

Walsh *et al.*, (1995) recommend that gulls are counted using AONs, though where it is not possible to see all incubating birds, or when chicks have already hatched, then counts of AOTs based on the number of adults present need to be used. Observers in the field make a judgement on the position and behaviour of birds (where nests are not visible) as to whether birds are a member of a pair and on territory or not. It is acknowledged that the errors involved in the use of AOTs rather than AONs can be higher. At some of the north Caithness sites this problem was exacerbated by the presence in and around some colonies of flocks of non-breeding birds. This may have tended to cause gull counts to be overestimates of the actual number of breeding pairs. This may also explain some of the variation in trends found between different sections. Added to this was that counts of the Holborn Head sections were made of individuals, not AOTs. Although these counts have then been converted to AOTs, the figure given should be regarded as an estimate of numbers.

It is not known which particular colonies were counted in 1986 and 1999/2000 as AONs or AOTs.

Atlantic puffins are difficult to monitor. In this survey it was only possible to count individuals ashore rather than estimate the number of occupied burrows. Counts of individuals are usually highest towards dusk and considered to most accurately reflect the number of breeding adults early in the season (Walsh *et al.*, 1995). Most of the north Caithness counts were not done at the ideal time. In June 2000 the four counts completed over an 11 day period at the largest colony MEL2 varied between 395 and 3985 individuals. This highly variable nature of counts of puffin ashore means trends recorded by this species at different sites (e.g. – 90% at Duncansby Head SSSI to +157% at Dunnet Head SSSI) should be treated with great caution.

5.2 North Caithness Cliffs SPA trends v national trends

The SNH Biodiversity indicator ([Scottish Biodiversity Indicator - Abundance of Breeding Seabirds](#)) which highlighted trends in abundance and productivity of Scottish seabirds showed that between 1986 and 2011 mean seabird abundance in Scotland had declined by 53% and breeding productivity had declined by 37% over the same period. Breeding seabird numbers are affected by both short term and long term changes in various environmental factors such as sea surface temperature, food availability and weather conditions (Wanless & Harris, 2012). This may lead to different species or different areas showing different trends over different time scales.

5.2.1 Short-term trends since 1999

For five species (northern fulmar, European shag, great black-backed gull, herring gull and razorbill) breeding at the North Caithness Cliffs SPA the changes in numbers since the 1999 survey suggest that they are faring better than either the total UK or Scottish populations of these species. As discussed above some of this apparent change could be due to changes in methodology; although this effect cannot be quantified it is most likely small. In 1999 a high proportion of counts were recorded as estimates as the whole count site could not be properly viewed. It is not known how accurately estimated counts represent the actual numbers present in 1999, but experienced observers undertook the counts.. When compared to the national trends most of the changes noted at the North Caithness Cliffs SPA are so different it would suggest that different environmental factors are operating locally compared to other parts of the country. This was also the case with the East Caithness Cliffs SPA (Swann 2016), where it was suggested that abundant food supplies locally may have led to high seabird attendance on the cliffs in 2015.

5.2.2 Long-term trends since 1986

Over the longer term northern fulmar and razorbill are also faring better or showing similar trends to that shown at a Scottish or UK level, whilst the decline in black-legged kittiwake equals the national decline. Common guillemot, despite the more recent decline in number, shows an overall increase since 1986, well above both the Scottish and UK long-term trends, mainly due to the rapid rise in numbers that took place between 1986 and 2000.

6. CONCLUSIONS AND RECOMMENDATIONS

The monitoring results indicate that since 1999 at North Caithness Cliffs SPA there has been an 81% increase in the numbers of great black-backed gulls, a 66% increase in European Shags, a 33% increase in herring gulls, and a 39% increase in the numbers of razorbills. Over the same period the number of northern fulmars declined by 7%, common guillemots by 53%, black-legged kittiwakes by 55% and Atlantic puffins by 55%. These rates of increases tended to be greater than those recorded for these species nationally (up to 2015), while the decreases tended to be less than those recorded nationally (up to 2015). Over the longer term since 1986 similar trends are apparent with the exception of common guillemot where numbers are actually 93% higher than those recorded in 1986, whereas nationally there has been a 10% decline at a Scottish level.

In order to reduce the effects of changing methodology the following recommendations are made.

1. All section start and end points are carefully recorded by hand held GPS and if necessary illustrated on a photograph (particularly when the counting/GPS position is well back from the actual boundary).
2. Where there is a mixture of land and sea counts in a section photographs are used to try and clearly mark the sub-sections counted from land so that these are available during the boat based surveys (if the boat based surveys take place later).
3. On all complex or busy sections of coastline a series of overlapping photographs are taken at the same time as the count to enable any field counts to be double checked.

7. REFERENCES

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ANNEX 1: COUNT SECTIONS

Section	Site code	grid start	grid end
Skirza Head	SK11	ND394681	ND399697
Duncansby Stacks	DNH1	ND399697	ND403728
Duncansby Head	DNH2	ND403728	ND402736
Gills Bay - Head of Crees	GIL1	ND346733	ND318745
St Johns Point	SJP1	ND318745	ND306749
Longeo Skerries	MEY1	ND306749	ND281743
Stroma	OMA1	ND355775	ND355775*
Scarfskerry	SCA1	ND281743	ND259746
Scarfskerry 2	SCA2	ND259746	ND234742
Little Clett	CLE1	ND234742	ND217751
Dunnet Head 1	DUN1	ND217751	ND212764
Dunnet Head 2	DUN2	ND212764	ND206767
Dunnet Head 3	DUN3	ND206767	ND195764
Dunnet Head 4	DUN4	ND195764	ND183745
Dunnet Head 5	DUN5	ND183745	ND207713
Clardon Head	CLA1	ND167696	ND122687
Holborn Head 1	HOL1	ND107707	ND109716
Holborn Head 2	HOL2	ND109716	ND083712
Holborn Head 3	HOL3	ND083712	ND072711
Ness of Litter	NES1	ND072711	ND040714
Ushat Head 1	USH1	ND040714	NC992679
Ushat Head 2	USH2	NC992679	NC957663
Sandside Head 1	SAN1	NC957663	NC940659
Sandside Head 2	SAN2	NC940659	NC930660
Melvich 1	MEL1	NC930660	NC921656
Melvich 2	MEL2	NC921656	NC916655
Melvich 3	MEL3	NC916655	NC898659
Melvich 4	VIC1	NC898659	NC876667
Melvich 5	VIC2	NC876667	NC853664
Strathy 1	STR1	NC853664	NC834668

* start and end point identical as section is entire island coastline.

Sites in red are out-with the North Caithness Cliffs SPA

ANNEX 2: COUNT SECTION VISIT DETAILS

Site code	Method	Date	Observers	Vis	Sea	Rain	Wind
SKI1	1.2 Land Based	02/06/2015	MMH, NS, GT	1	3	2	4
SKI1	1.1 Boat Based	04/06/2015	AR, GT	1	2	1	2
DNH1	1.2 Land Based	02/06/2015	MMH, NS, GT	1	3	2	4
DNH1	1.1 Boat Based	04/06/2015	AR, GT	1	2	1	2
DNH2	1.2 Land Based	02/06/2015	MMH, NS, GT	1	4	3	4
DNH2	1.1 Boat Based	04/06/2015	AR, GT	1	2	1	2
GIL1	1.1 Boat Based	04/06/2015	AR, GT	1	2	1	2
SJP1	1.1 Boat Based	04/06/2015	AR, GT	1	2	1	2
MEY1	1.1 Boat Based	04/06/2015	AR, GT	1	2	1	2
OMA1	1.1 Boat Based	12/06/2016	GT, AD	1	2	1	2
SCA1	1.1 Boat Based	11/06/2016	GT, AD, SW	1	2	1	2
SCA2	1.1 Boat Based	11/06/2016	GT, AD, SW	1	2	1	2
CLE1	1.1 Boat Based	11/06/2016	GT, AD, SW	1	2	1	2
DUN1	1.1 Boat Based	11/06/2016	GT, AD, SW	1	2	1	2
DUN2	1.1 Boat Based	11/06/2016	GT, AD, SW	1	2	1	2
DUN3	1.1 Boat Based	13/06/2016	GT, AD, SW	1	2	1	2
DUN4	1.1 Boat Based	13/06/2016	GT, AD, SW	1	2	1	2
DUN5	1.1 Boat Based	13/06/2016	GT, AD, SW	1	2	1	2
CLA1	1.1 Boat Based	11/06/2016	GT, AD, SW	1	2	1	2
HOL1	1.2 Land Based	02/06/2015	CE, CL, FM	1	2	2	1
HOL2	1.2 Land Based	02/06/2015	CE, CL, FM	1	3	1	2
HOL2	1.1 Boat Based	13/06/2016	AD, GT	1	3	1	3
HOL3	1.2 Land Based	02/06/2015	CE, CL, FM	1	3	2	3
NES1	1.2 Land Based	02/06/2015	CE, CL, FM	1	3	1	2
USH1	1.1 Boat Based	13/06/2016	GT, AD	1	2	1	2
USH2	1.1 Boat Based	13/06/2016	GT, AD	1	2	1	2
SAN1	1.2 Land Based	02/06/2015	TB, EK, KT	1	2	2	3
SAN2	1.2 Land Based	02/06/2015	TB, EK, KT	1	2	2	3
MEL1	1.2 Land Based	02/06/2015	TB, EK, KT	1	2	2	3
MEL2	1.1 Boat Based	13/06/2016	GT, AD	1	2	1	2
MEL3	1.1 Boat Based	13/06/2016	GT, AD	1	2	1	2
VIC1	1.1 Boat Based	13/06/2016	GT, AD	1	2	1	2
VIC2	1.1 Boat Based	13/06/2016	GT, AD	1	3	1	2
STR1	1.1 Boat Based	13/06/2016	GT, AD	1	2	1	2

Notes:

Site Code: Refers to count sections as listed in Annex 1.

Method: Counted from land or sea

Observers: For names see Acknowledgements

Weather codes:

Visibility: 1 good, 2 fair, 3 poor. **Sea State:** 1 flat calm, 2 small waves, 3 large waves, 4 white wave crests, 5 waves breaking high onto rocks. **Rain:** 1 none, 2 discontinuous light, 3 discontinuous heavy, 4 continuous light, 5 continuous heavy. **Wind (beaufort Scale):** 0, 1, 2, 3, 4, >4

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